

Autonomous UAVs for Search & Rescue, and Disaster Response

Luke Teacy

Agents, Interaction & Complexity Group
Electronics and Computer Science

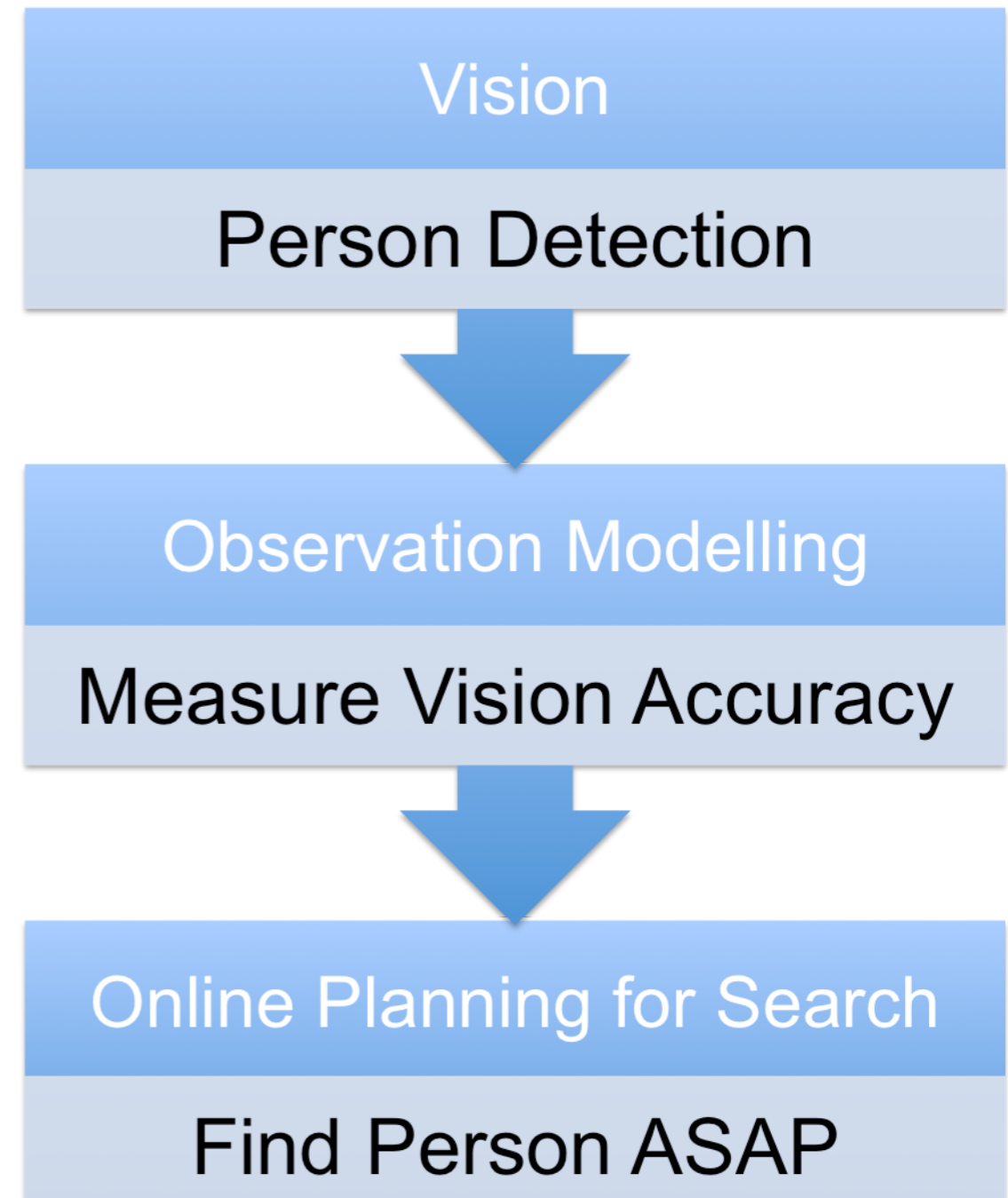
Motivation

- Aerial view invaluable for sensing / situation awareness
 - *Search & Rescue*
 - *Disaster Response*
- Unmanned Aerial Vehicles
 - *Low Cost & Easy to deploy*
 - *But still require high-degree of operator input*
- Autonomous Agents
 - *Allow operators to focus on high-level goals*
 - *Delegate low-level decisions to UAVs*
 - *Better coordination between multiple platforms*



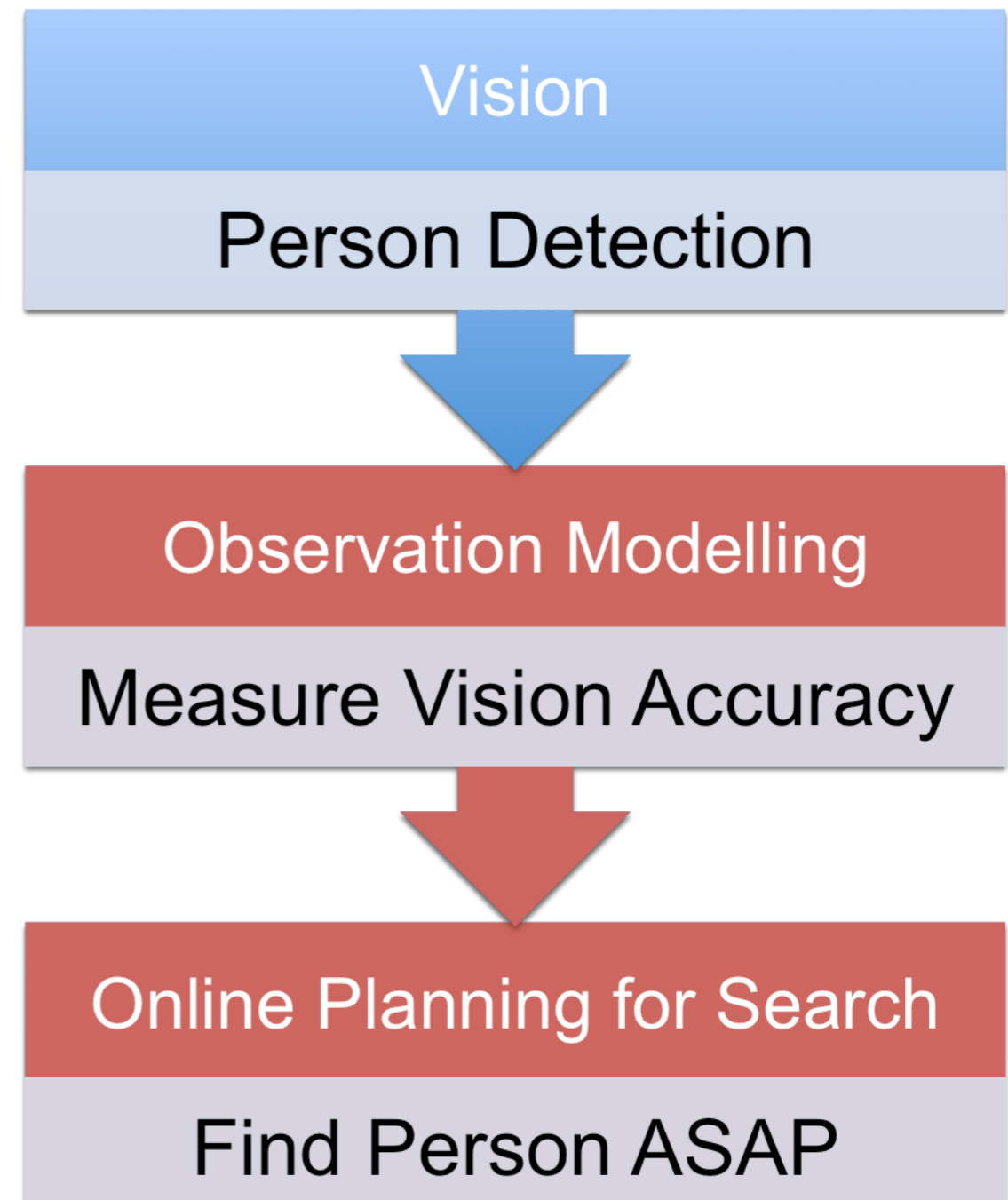
Active Sensing for Target Search

- Find Missing Person
 - *Search Using Camera-Equipped UAV*



Active Sensing for Target Search

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- Challenges
 - *Vision affected by Clutter, Relative Camera Position*
 - *Observations Correlated in Space & Time*
 - *Informative Path Planning*
 - *Multi-UAV Coordination*



Technologies

- Bayesian Observation Modelling
 - *Learn probabilistic model of classifier*
 - *Predict both **Accuracy** & **Correlation***
 - *Function of relative camera-position*
- Informative Path Planning
 - *Information Theory / Value of Information*
 - *Monte Carlo Tree Search*
- Coordination
 - *Distributed Constraint Optimisation (DCOPs)*
 - *Task Allocation*
 - *Factored Tree Search*

